Banana Xanthomonas wilt sampling procedures

Adriko, J.; Kubiriba, J.; Tushemereirwe, W.K.; Mbega, E.R.; Mabagala, R.B.; Mondjana, A.M.; Bila, J.; Lund, Ole Søgaard; Mortensen, Carmen Nieves

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Sampling from pseudostems, peduncle and fruit showing signs of BXW.

PCR tests:

a b c

PCR tests[a] results pattern: (a) positive control gives 2 bands; (b) positive test banana sample gives 2 bands; (c) a negative test sample shows only 1 band.

Extension officer describing the magnitude of banana *Xanthomonas* wilt disease in Northern Tanzania.

Sample information:

Company name/ Your name: ----------

Address: ----------
Phone #: ----------
Fax #: ----------
Name of host:----------
Variety or cultivar:----------
Location of plot: ----------
Sample #----------Date:---------

Contact address

Denmark:
Danish Seed Health Centre (DSHC), Faculty of Science, University of Copenhagen, Hoejbakkegaard Allé 9, 2630 Taastrup, Denmark
Phone: +45 35 3333186
E-mail: cnm@life.ku.dk
www.dshc.life.ku.dk

Tanzania:
African Seed Health Centre (AfSHC)
Sokoine University of Agriculture
P.O. Box 3005
Morogoro, Tanzania
Phone: +255 232 600 573
E-mail: rmabagala@yahoo.com
Fax: +255 232 600 574
www.afshc.or.tz

Uganda:
NARL-Kawanda, P.O. Box 7065
Kampala, Uganda
Phone: +256 773 155 760
E-mail: banana@imul.com;
jkubiriba@kari.go.ug
www.banana.go.ug

Mozambique:
Universidade Eduardo Mondlane (UEM)
Maputo, Mozambique
E-mail: amondjana@uem.moz;
anamondjana@gmail.com;
joaobilay@yahoo.com.br
Phone: +258-214 921 78
Fax: + 258-214976

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Compiled by:

J Adriko, J Kubiriba, W.K. Tushemereirwe (NARL)

ER Mbega, RB Mabagala (AfSHC)

AM Mondjana, J Bila (UEM)

OS Lund, CN. Mortensen (DSHC)

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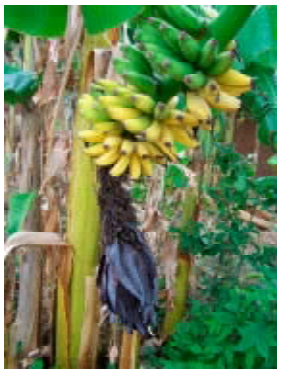
UNIVERSITY OF COPENHAGEN

Danish Seed Health Centre for Developing Countries

Research outputs from Danida Enreca Project Life-731

Xanthomonas wilt: a serious bacterial disease of banana

Collecting your samples for the diagnosis of BXW-



Banana plants showing severe symptoms of BXW (Uganda); BXW infected stems and fruits in a farmer's field in Tanzania.

Introduction

Banana is a stapple food for many in Africa, Asia and Latin America. Banana *Xanthomonas* Wilt (BXW), is an emerging serious disease affecting banana and plantains in eastern and central Africa, and a threat to crop production in the region.

There is much confusion on what can be the causal agent of wilts that can be of physiological nature or due to pathogens infection in banana.

Identification of the causal agent for proper management of the disease is often verified by subject matter specialists at central diagnostic laboratories.

In this booklet information is given on BXW symptoms, and sampling procedures to support disease diagnosis by molecular- based PCR tests[a] conducted at a specialised laboratory.

Symptoms

On leaves: Symptoms are characterised by a dull yellow wilt of the leaves, and may appear as burnt; often the central upper leaf may wilt first and followed by yellowing and wilting of newly expanded leaves of the infected plant. BXW wilt-infected leaves may bend about one-third the leaf length from the leaf tip.

On flowers: The bracts of infected male buds may appear discoloured, deep purple to dark brown or grey, with drying rot, shrivelling and eventually die.

On fruits: Premature even ripening of fruits, which rot and harden; fruits show brown and/or yellow-orange discolouration with bacterial ooze (pus-like).

On pseudostems: Internal symptoms in cut pseudostems are a yellow-orange discoloration of vascular tissue (vascular streaking) with some bacterial ooze. Massive yellow-orange bacterial ooze in severely affected plants can be released after 5-30 minutes.

Causal agent

Xanthomonas campestris pv. musacearum

Common name of the disease:

Mozambique: Murcha bacteriana da bananeira
Tanzania: Mnyauko wa migomba unaosbabisishwa na bakteria
Uganda: Kiwotoka

Sampling from cross-sectioned peduncle of banana inflorescence affected by BXW.

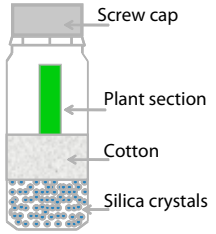
Collection of samples

(1) Select sections 5 cm long from the edge of plant lesions with disinfected tools (treated with a sterilant or flamed by heat)

(2) Label tubes with date, name of variety, locality , farmer, extension officer or agency

(3) Place individual samples into a clean and labelled test tube containing crystals of silica gel and cotton

(4) Ship the sample(s) as soon as possible to the nearest diagnostic laboratory for PCR tests[a]



BXW

The leaflet was compiled from existing literature and research outputs from the Danida Enreca project Life-731 at the time of writing.

Timing and selection of plant parts for sampling:
The disease is readily detected in leaves, pseudostems and petioles all year round. The pathogen is of a systemic nature and this may involve the upward movement of bacteria through the vascular tissues if infection occurs in the lower parts of the plants (rhizome or pseudostem) or the downward movement of bacteria if infection occurs through the inflorescence.

Time for completion of tests:

The assay with BXW species specific primers[a] may take 1-2 days without pathogen isolation

[a] Adriko J, Aritua V, Mortensen CN, Tushemereirwe WK, Kubiriba J and Lund OS. 2011. Multiplex PCR for specific and robust detection of *Xanthomonas campestris pv. musacearum* in pure culture and infected plant material. Plant Pathology 61,489-497. Doi: 10.1111/j.1365-3059.2011.02534.x